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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Y. J. Hu

Title: BURIED DIGIT LINE STACK AND PROCESS FOR MAKING SAME

Docket No.: 303.808US2

Serial No.: 10/636180

Filed: August 7, 2003

Due Date: May 20, 2004

Examiner: David Nhu

Group Art Unit: 2818

**MS Amendment**

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

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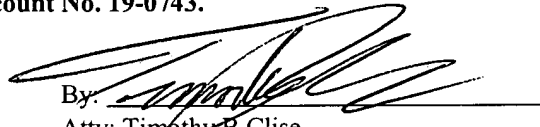
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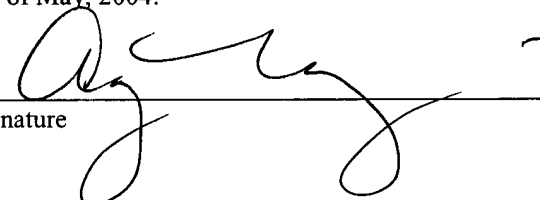
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(GENERAL)



S/N 10/636,180

PATENT

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AMENDMENT AND RESPONSE UNDER 37 CFR § 1.111

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

This paper responds to the Office Action mailed on February 20, 2004. Please amend the above-identified patent application as follows.

### IN THE DETAILED DESCRIPTION

Please amend the paragraph on page 6, beginning on line 1, as follows:

In one embodiment the refractory metal that is used, is generated from a refractory metal silicide target to form the refractory metal first film 226. According to this process embodiment, the refractory metal silicide first film 226 includes PVD forming a solid solution of refractory metal silicide according to the formula  $MSi_x$ , and the refractory metal is M and  $0 < x \leq 3$ . In an embodiment, the metal silicide is formed according to the formula  $MSi_x$ , the refractory metal is M, and  $0 < x \leq 1.8$ .

Please amend the paragraph on page 7, beginning on line 5, as follows:

The sputtering target that is used to make the amorphous refractory metal silicide nitride second film 228, has a formula of  $MSi_x$ , and the refractory metal is M, and  $0 < x \leq 3$ . In one embodiment the target is silicon rich such that the target includes a formula of about  $MSi_{2.2}$ . Sputtering is carried out reactively in the presence of nitrogen such that the refractory metal silicide target with a formula of  $MSi_x$  results in a refractory metal silicide nitride second film 228 with a formula of about  $MN_ySi_x$ , and the refractory metal is M, and  $0 < x \leq 3$ , and  $0 < y \leq 1$ . In an embodiment, the sputtering target that is used to make the amorphous refractory metal silicide nitride second film 228, has a formula of  $MN_ySi_x$ , and the refractory metal is M, and  $0 < x \leq 2.5$ , and  $0 < y \leq 1$ . Although no specific theory is proposed, it is recognized that the presence of nitrogen may act to cause an amorphous second film 228 to form under known sputtering conditions.

Please amend the paragraph on page 8, beginning on line 16, as follows:

The average grain size 232 of the refractory metal third film 230 is in a range from about one-tenth the characteristic dimension 234 of the polysilicon plug 224 to greater than the characteristic dimension 234. The average grain size 232 depicted in FIG. 2A, is illustrated also in an arbitrary size, shape, and location (centered over the polysilicon plug 224) for illustrative convenience. In an embodiment where the conductive plug 232 includes a characteristic

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dimension W, forming the refractory metal third film 230 is carried out under conditions to cause an average grain size therein in a range of about  $0.1W \leq \text{gs} \leq 10W$ . Other average grain sizes, shapes, and locations are achievable according to various processing conditions set forth herein, and as known in the art.